Extra Practice - Combining Functions
SOLUTIONS

5) $f(x)+g(x)$

$= 3x^2+4x-5+2x+9 = \boxed{3x^2+6x+4}$

$f(x)-g(x)$

$= 3x^2+4x-5-1(2x+9)$

$= 3x^2+4x-5-2x-9 = \boxed{3x^2+2x-14}$

$f(x)\cdot g(x)$

$= (3x^2+4x-5)(2x+9)$

	$3x^2$	$4x$	-5
$2x$	$6x^3$	$8x^2$	$-10x$
9	$27x^2$	$36x$	-45

$= \boxed{6x^3+35x^2+26x-45}$

$\left(\frac{f}{g}\right)(x) = \boxed{\frac{3x^2+4x-5}{2x+9}}$

6) $[f\circ g](x) = f(g(x))$

put g → inside f

$= 2(3+x)+5$

$= 6+2x+5$

$= \boxed{11+2x}$

$[g\circ f](x) = g(f(x))$ ← put f inside g

$= 3+(2x+5)$

$= \boxed{2x+8}$

7) $[f \circ g](x) = f(g(x))$

$= 2(x^2 - 2x) - 3$

$= \boxed{2x^2 - 4x - 3}$

$[g \circ f](x) = g(f(x))$

$= (2x-3)^2 - 2(2x-3)$

$= (2x-3)(2x-3) - 4x + 6$

$= 4x^2 - 6x - 6x + 9 - 4x + 6$

$= \boxed{4x^2 - 16x + 15}$

11) $f(x) + g(x)$

$= x^2 - 2x + x + 9$

$= \boxed{x^2 - x + 9}$

$f(x) - g(x)$

$= x^2 - 2x - 1(x+9)$

$= x^2 - 2x - x - 9$

$= \boxed{x^2 - 3x - 9}$

$f(x) \cdot g(x)$

$= (x^2 - 2x)(x + 9)$

$= x^3 + 9x^2 - 2x^2 - 18x$

$= \boxed{x^3 + 7x^2 - 18x}$

$\frac{f(x)}{g(x)} = \boxed{\frac{x^2 - 2x}{x + 9}}$

* Don't worry about #12, 13, 14 ... there won't be functions that are fractions on tomorrow's quiz.

15) $[f \circ g](x) = f(g(x))$

$= (x+4)^2 - 9$

$= (x+4)(x+4) - 9$

$= x^2 + 4x + 4x + 16 - 9$

$= \boxed{x^2 + 8x + 7}$

$[g \circ f](x) = g(f(x))$

$= (x^2 - 9) + 4$

$= \boxed{x^2 - 5}$

16) $[f \circ g](x) = f(g(x))$

$= \frac{1}{2}(x+6) - 7$

$= \frac{1}{2}x + 3 - 7$

$= \boxed{\frac{1}{2}x - 4}$

$[g \circ f](x) = g(f(x))$

$= (\frac{1}{2}x - 7) + 6$

$= \boxed{\frac{1}{2}x - 1}$

17) $[f \circ g](x) = f(g(x))$

$= \boxed{3x^2 - 4}$

$[g \circ f](x) = g(f(x))$

$= 3(x-4)^2$

$= 3(x-4)(x-4)$

$= 3(x^2 - 4x - 4x + 16)$

$= 3(x^2 - 8x + 16)$

$= \boxed{3x^2 - 24x + 48}$

18) $[f \circ g](x) = f(g(x))$

$= (5x^2)^2 - 1$

$= \boxed{25x^4 - 1}$

$[g \circ f](x) = g(f(x))$

$= 5(x^2-1)^2$

$= 5(x^2-1)(x^2-1)$

$= 5(x^4 - x^2 - x^2 + 1)$

$= 5(x^4 - 2x^2 + 1)$

$= \boxed{5x^4 - 10x^2 + 5}$

19) $[f \circ g](x) = f(g(x))$

$= 2(x^3 + x^2 + 1)$

$= \boxed{2x^3 + 2x^2 + 2}$

$[g \circ f](x) = g(f(x))$

$= (2x)^3 + (2x)^2 + 1$

$= \boxed{8x^3 + 4x^2 + 1}$

20) $[f \circ g](x) = f(g(x))$

$= 1 + (x^2 + 5x + 6)$

$= \boxed{x^2 + 5x + 7}$

$[g \circ f](x) = g(f(x))$

$= (1+x)^2 + 5(1+x) + 6$

$= (1+x)(1+x) + 5 + 5x + 6$

$= 1 + x + x + x^2 + 5 + 5x + 6$

$= \boxed{x^2 + 7x + 12}$

* Don't worry about #21 - 24